

STATEMENTS

Preparing for a Renaissance in Pharmacy Education: The Need, Opportunity, and Capacity for Change

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The typical approach to course delivery in higher education, particularly for those courses that are considered “foundational” and are rich with factual content, has remained unchanged for decades. In the usual paradigm, reading or other activities intended to prepare students or provide background information, often in the form of textbooks authored by the lecturer, are provided prior to class. Educators generally believe that students who come to class with the requisite knowledge will be prepared to ask intelligent and informed questions, engage in dialog, or simply be in position to acquire additional information during the class session. This traditional educational strategy has focused largely on communication, retention, and repetition of factual information. While this approach is efficient in achieving a specific endpoint (graduating students who have been exposed to, and hopefully mastered, a well-defined body of knowledge), it does little to bolster perhaps the greatest asset of a bright and motivated student: the ability to critically assess information and utilize that assessment to solve complex problems. Instead, the end result often is students who have a multitude of facts at their fingertips, but are ill-prepared to bring those facts to bear on real-world problems.

The authors’ experience has been that this classic approach no longer serves students or faculty members well. It is common for students to not complete assigned readings or activities prior to class, in part because they are not held accountable for being prepared. Consequently, we have migrated away from traditional pedagogy, and contact time in the classroom is increasingly devoted to transmitting basic, foundational content from the instructor to the student. Considering the amount of factual material that must be mastered in a professional pharmacy curriculum, the use of class time to communicate such information limits the opportunity to explore concepts in depth, engage students at higher intellectual levels, or reinforce problem-solving and critical thinking skills.

Predictably, frustration with the pedagogical status quo is high. Students are frustrated because contemporary technology provides multiple options for efficient acquisition of information; sitting in a classroom with dozens of classmates listening to a traditional, content-rich lecture is viewed as a waste of time. Faculty are frustrated because, in general, they wish to engage students at a higher level of learning than that associated with the simple transmission of factual information. The need to provide students with foundational content in class, coupled with large class sizes and complex in-class dynamics, virtually eliminates meaningful student-faculty dialog within the classroom environment. Administration is frustrated because the academic organization’s most valuable intellectual resource, its faculty members, must devote the majority of their student-contact time to the dissemination of information, with limited opportunities to leverage that intellectual resource to enrich didactic education.

We contend that students, faculty members, and society as a whole deserve more from contemporary higher education than what is often provided. Meeting those expectations, however, requires a fundamental and comprehensive change in how we, as a community of educator/scholars, view, value, and discharge our responsibilities to this core mission. In the fall of 2006, the University of North Carolina at Chapel Hill School of Pharmacy undertook a strategic planning process. The plan adopted by the faculty included 4 strategic initiatives, one of which was entitled “Educational Renaissance.”¹ The broad and ambitious goal of this initiative is to “transform the educational process to prepare professional and graduate students to enter into their profession and continue to develop throughout their careers.” Approaches to achieving this goal have included focusing on curricular and outcomes assessment, reforming our teaching model to emphasize higher-order learning activities, utilizing the educational process as an important potential area for scholarly endeavors, and clearly valuing faculty efforts in didactic and experiential education.

Relative to this latter point, we also undertook a comprehensive revision of our School’s guidelines for faculty appointment, promotion, and tenure to ensure that true

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scholarship in the area of education and instructional innovation could be appropriately identified, recognized, and rewarded. Our current approach defines the scholarship of education as the practice of teaching and intellectual pursuits that advance the educational process, and places an equal value on all 3 traditional areas of scholarship: education, discovery (often viewed as “basic research”), and application (including many elements of “translational research”). It is our view that an academic organization must provide a credible path to promotion or tenure, in conjunction with other recognition and reward mechanisms that might be available, if it truly wishes to foster innovative educational scholarship.

One approach that we are exploring is to reinvigorate, and indeed reestablish, the traditional educational paradigm through appropriate use of technology. In the summer of 2007, we began developing a series of multimedia educational tools (integrated learning accelerator modules, or iLAMs) to assist students in learning foundational content outside the classroom. These tools have several hallmarks that address a variety of concerns with respect to contemporary higher education: they are self-paced, interactive, provide immediate feedback, and accommodate a variety of learning styles, preferences, and strategies. Tools such as these invest the student with a measure of control over the learning environment and process. They also provide the student with an opportunity to try, fail, and re-try without the penalties (low grades, embarrassment among peers, forced remediation) often associated with failure in the traditional educational paradigm. In addition, they are capable of capturing and reporting student performance at each stage of the learning process (acquisition of information, practice of requisite skills, and assessment of knowledge), thereby introducing an element of student accountability that is difficult to achieve with traditional modalities and clearly is a crucial component of success. It becomes possible, for example, to adopt an approach that requires students to reach specified performance criteria before proceeding to a subsequent segment of the course.

Technological approaches to content delivery augment, rather than replace, out-of-class assignments such as reading material from textbooks or the primary literature. Indeed, reading assignments become more focused, and student understanding and retention of material is improved, by providing initial context for the material. Such approaches also may have sufficient flexibility to adapt to individual learning styles. For example, significant attention in the lay press has been devoted to the question of why male students tend to struggle more than female students in primary and secondary education in the United States.² Although the reasons for differences in

success are undoubtedly varied and complex, one potential explanation is simply that male and female students learn differently (or perhaps more generally, a single educational strategy, one that might simultaneously reward some students and penalize others based simply upon their individual learning preferences, does not serve all students equally well). Overall, we believe that such an approach will optimize the learning process while simultaneously “raising the bar” in terms of the overall intellectual content of a given course.

An obvious question regarding this strategy is: How will classroom time be used if the majority of the foundational content is learned outside of class? Student-instructor contact time will focus on higher-level intellectual activities: concept integration, communication, critical and creative thinking, problem solving, and practical implementation of knowledge. This might be achieved, for example, by subdividing each class into smaller groups (eg, 50 rather than 150), each of which meets with the instructor less frequently (once versus 3 times per week). This approach should improve learning outcomes in a variety of ways. The classroom itself becomes student-centered, with an increased level of student-instructor and student-student interactions, and the instructional sessions become less structured. The “virtual instruction environment” (ie, the student working within an individual module) affords the student leeway with respect to learning strategy, requires the student to be an active participant in the learning process, and demands an element of self-management from the student. Each of these characteristics is thought to increase student creativity and problem-solving capabilities.

There is an increasing emphasis in higher education on the production of “expert learners.”³ Such learners are able to discern patterns and meanings not immediately apparent to novices in the discipline. They not only have in-depth knowledge of the discipline, but have an organized set of facts that are accessible, transferable, and applicable to a variety of problems or situations. Finally, they can easily retrieve and repurpose knowledge in order to learn new facts and develop new relationships. The integrated approach we propose is in close alignment with the broad goal of graduating “expert learners” in pharmacy.

One might also reasonably ask: Why should pharmacy schools assume a leadership role in this endeavor? It is our belief that pharmacy is an ideal discipline in which to pursue “proof-of-concept” for this substantive change in educational strategy. Pharmacy curricula are rich in foundational material (primarily factual information) that must be mastered by the student. However, students must not only acquire this factual base, but also

must be able to connect often seemingly disparate facts in a manner that allows them to solve specific problems. Thus, the optimal educational process, while providing the requisite factual information, also must foster the student's ability to identify what pieces of information are required, to construct a problem-solving strategy with those pieces of information, and to communicate the results of their strategy to others. So, not only will pharmacy education benefit from this transformation in approach, but it will serve as a template for many other disciplines that require mastery of factual content and the ability to apply that content to identifiable problems.

A secondary, but nonetheless important, aspect of this effort is the opportunity for faculty scholarship. Curricular change in higher education typically is a relatively passive process, with faculty members responding to a mandate for change; in most cases, little or no concerted effort is made to assess how changes in instructional strategy or technique impact student learning. By utilizing technology as a medium of student learning, it is possible to collect critical information regarding the efficacy of change from an educational standpoint. Such efforts would allow the systematic study of potential benefits as a consequence of comprehensive changes in educational strategy, thereby facilitating rational decisions, as an educational community, regarding the cost-benefit balance. Ultimately, we hope that these efforts would also allow us to understand not only *what* students learn, but actually *how* they learn. As instructors, we may be able to "phenotype" students based on learning strategy and style, identify students experiencing particular difficulties in learning specific material, and adapt an educational approach that will better fit that individual's strengths

and effectively address that individual's weaknesses. In a manner analogous to the biomedical community's mandate for both "evidence-based" and "personalized" medicine, instructors will be able to explore the practicality of pursuing "personalized" education in an "evidence-based" manner.

In summary, we believe that it is possible to transform pharmacy education in a number of tangible ways. The manner in which we pursue classroom instruction can be changed almost completely, enhancing both the efficiency and effectiveness of this core responsibility. Secondly, we have the capacity to provide unique opportunities for scholarship in an area of obvious importance that currently is under-represented; pursuit of this scholarship may lead to significant intellectual property and a novel area of entrepreneurship. Finally, availability of truly interactive educational tools may eliminate the need to recruit faculty members for the primary purpose of providing traditional lectures within particular content areas in didactic coursework, allowing other factors (eg, achieving a balanced research portfolio, bolstering novel areas of scholarship, or strengthening clinical services and associated experiential education) to drive faculty recruitment to a more significant degree than currently is feasible.

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